THE PARADOXES AND MANIPULATION IN TURKISH PARLIAMENTARY ELECTIONS SELECTION OF ARTICLES BY UĞURCAN EVCI

We present a selection of articles by Uğurcan Evci and Marek M. Kamiński on electoral manipulation in Turkish parliamentary elections. The article by Evci is an original contribution while the second article is a translation of an article published in *Turkish Studies* (Evci and Kaminski 2020).

Turkey has a single-house parliamentary system with 600 seats elected in 87 districts with the help of Jefferson-D'Hondt algorithm of proportional representation. The electoral districts are strongly differentiated in terms of political preferences of their inhabitants due to high ethnical heterogeneity of the country, and in particular to concentration of the Kurdish population in south-eastern Turkey which makes the support for the HDP, a party representing the Kurdish minority, very strong in some areas and almost non-existent in other ones. This phenomenon results in limited applicability of the FSS formula (Flis, Słomczyński and Stolicki 2019, 2020) designed to estimate seat allocations under the Jefferson-D'Hondt method by using only the vote shares on the national level. In his paper, Evci proposes a regional correction of this formula by applying it to separate regions that are reasonably homogenous politically and shows that dividing the country into just three large regions highly improves the predictions of the seats' distribution in a number of Turkish parliamentary elections in the last two decades.

Turkish parliamentary elections also offer exceptional opportunities for electoral manipulators and generate many voting paradoxes thanks mostly to the extremely high electoral threshold of 10% for single parties, which is the highest in the world. The threshold was introduced by the military administration after the *coup d'état* in 1980, arguably in order to reduce the effective number of parliamentary parties (ENPP) (Bakke and Sitter 2005; see also Taagepera and Shugart 1989, Cox 1997). High thresholds create room for electoral engineering since they may help one's allies pass the threshold or keep opponents below it (see Moraski and Loewenberg 1999 on threshold effects in Central European elections). In Poland, the most dramatic consequences of electoral thresholds took place in the 1993 parliamentary elections, when several rightist parties failed to win seats, and leftist SLD and PSL jointly received 65.87% of seats with only 35.81% of votes and formed the cabinet (Kaminski et al. 1998).

Regardless of the effect on the ENPP, the combination of the high threshold for single parties with the Jefferson-D'Hondt method, which favors the largest parties

(Balinski and Young 1978), paved the path in Turkey for persistent parliamentary disproportionality. For example, in the 1999 elections, two medium-sized parties fell below the threshold with 8.71 percent and 4.75 percent of the total vote; the total of 18.32% valid votes was not represented. In the even more dramatic election of 2002, the current ruling party of Turkey, AKP, won the majority for the first time. In that election, five parties received between five and ten percent of the total vote (9.54%, 8.36%, 7.25%, 6.22%, and 5.13%), and only two major political parties entered the parliament. Political parties that received a staggering 45.33% of valid votes were left outside of the parliament.

In general, "electoral engineering" denotes the attempts of designers to enact electoral laws supporting their objectives, as well as the attempts of competitors to hack the law. However, Evci and Kamiński provide a striking example of counterproductive effects of electoral engineering. They convincingly demonstrate that a change in the electoral law, i.e. introducing *apparentement* in the 2018 election by AKP, the ruling political party in Turkey, in fear that their coalitional partner would not meet the 10% threshold, resulted in losing the majority in the parliament which would have been comfortably retained under the old electoral law.

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REGIONAL CORRECTION OF THE FLIS-SŁOMCZYŃSKI-STOLICKI FORMULA: THE CASE OF TURKISH ELECTIONS[1]

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Abstract: *This paper proposes a correction to the Flis-Słomczyński-Stolicki (2019, 2020) formula for countries with large variation among their districts in terms of political divisions. The Flis-Słomczyński-Stolicki formula (FSS formula) estimates seat allocations under the Jefferson-D'Hondt method by using national vote shares, as well as other parameters that are often readily available. However, the FSS formula does not yield precise estimates in those countries where there are independent candidates, special rights assigned to minority parties, significant variation in district sizes, or an unequal distribution of votes due to ethnic or other regional divisions. Hence, I propose dividing the national distribution of votes into regions that satisfy the assumptions of the FSS formula within their district borders. By applying the FSS formula to regions consisting of historically and politically homogenous districts, I demonstrate that the formula's estimates become significantly more precise. For instance, by applying the regional correction to the 2018 Turkish Parliamentary elections, as well as other Turkish elections between 2007 and 2015, I show that the formula with the correction in three separate regions improves the Loosemore-Hanby goodness of fit estimates from 2.1 to 3.41 percentage points (95% CI). Thus, the correction might significantly improve the estimates of the FSS formula in various countries, including Spain, Peru, and Belgium.*

Key words: *Jefferson-D'Hondt, elections, electoral simulations, Turkish elections.*

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POPRAWKA NA ZRÓŻNICOWANIE REGIONALNE DO FORMUŁY FLISA, SŁOMCZYŃSKIEGO I STOLICKIEGO: PRZYPADEK WYBORÓW W TURCJI

Streszczenie: *W artykule zaproponowano korektę formuły Flisa-Słomczyńskiego-Stolickiego (2019, 2020) (dalej: formuła FSS) dla krajów o dużym regionalnym zróżnicowaniu okręgów wyborczych pod względem podziałów politycznych. Formuła FSS szacuje przydział mandatów według metody Jeffersona-D'Hondta tylko przy użyciu rozkładów głosów w skali kraju, a także innych, łatwo dostępnych parametrów systemu wyborczego. Formuła nie daje jednak dokładnych szacunków w krajach, w których występują kandydaci niezależni, partiom mniejszościowym są przyznane specjalne prawa, istnieją znaczne różnice w wielkości okręgów i jest zauważalny nierówny podział głosów ze względu na podziały etniczne lub regionalne. Proponuję podział krajowego rozkładu głosów na regiony spełniające w sobie założenia formuły FSS. Stosując formułę do regionów składających się z historycznie i politycznie jednorodnych okręgów, pokazuję, że szacunki formuły FSS stają się znacznie dokładniejsze. Stosując korektę regionalną do wyborów parlamentarnych w Turcji w 2018 r. jako głównego studium przypadku oraz do innych wyborów w Turcji w latach 2007–2015, pokazuję, że zastosowanie wzoru z korektą osobno do trzech regionów poprawia jakość szacunków według indeksu Loosemore–Hanby o 2,1% do poziomu 3,41% (95% CI). Stosowanie formuły FSS z korektą może znacząco poprawić jej szacunki w krajach takich jak Hiszpania, Peru czy Belgia.*

Słowa kluczowe: *Jefferson-D'Hondt, wybory, symulacje wyborcze, wybory w Turcji.*

In their paper, Flis, Słomczyński, and Stolicki (2019, 2020) introduce a formula (referred to as the "FSS formula" hereafter) that allows one to estimate seat allocations under the Jefferson-D'Hondt seat allocation method solely by using the national vote shares and other easily available parameters of the electoral system. In their work, the authors examine actual vote distributions in several European elections and find that their formula is able to predict the election results quite precisely. The FSS formula simplifies electoral simulations under the Jefferson-D'Hondt method, since it does not require knowing district-level vote shares. It also enables quick evaluations of the "effects of vote swings, coalition formation and breakup, spoiler effects, electoral engineering, artificial thresholds, and political gerrymandering" (p. 201). Their FSS formula is as follows:

$$s_i = p_i \cdot s + \frac{1}{2} c \, (p_i \cdot n - 1),$$

where n is the number of "relevant" parties; p_i is the vote share of party i among the relevant parties (called the "normalized" vote share); c is the total number of electoral districts; s is the total number of seats in parliament; and s_i is the total number of seats of party i in parliament.

There are several applications of the FSS formula. First, it provides advantages when modeling political counterfactuals resulting from the modifications of the electoral system, such as the introduction of statutory thresholds or changes in the number of districts. Although some such simulations are possible by analyzing data at the district level, obtaining district-level data can pose separate challenges, as demonstrated by Gudgin and Taylor (2012), Katz and King (1999), Blau (2001), Linzer (2012), and Calvo and Rodden (2015). Changing the number of districts constitutes problems that are difficult to solve without data that may be extremely difficult to obtain. However, by using the FSS formula, changing the number of districts requires only a quick recalculation of the results. This means that the formula allows one to evaluate the hypothetical effects of electoral reforms.

Second, the FSS formula enables simulations based on hypothetical party systems resulting from splits, mergers, or electoral coalitions, or hypothetical effects resulting from spoiler parties (Kaminski, 2018a, 2018b). Both Balinski and Young (1978) and Bochsler (2010) demonstrate that the Jefferson-D'Hondt system encourages electoral coalitions due to the seat-magnifying impact of the Jefferson-D'Hondt system. As Kaminski (2001), Leutgäb and Pukelsheim (2009), Janson (2014), and Karpov (2015) discuss, coalitions under the Jefferson-D'Hondt system benefit from a merger if the votes of the coalition members add up to each other and the other votes remain unchanged. However, exact additivity practically never occurs. In party splits and mergers, simulating distributions of votes at the district level is itself very complicated and requires making various assumptions about the partition function of party votes (Kaminski, 2001). The FSS formula, however, allows researchers to make certain estimates; for instance, one can estimate the minimal total proportion of votes that two parties would have to receive in order for their coalition to bring them at least as many seats as the total when they compete separately.

Third, the formula makes it easier to analyze the impacts of actual electoral engineering and electoral reforms (see, e.g., Evci & Kaminski, 2020a, 2020b). Typically, electoral engineering involves various changes in the parameters of electoral systems, such as seat allocation methods, statutory thresholds, or the number of electoral districts and their magnitudes (Kaminski, 2002). Using the FSS formula, policymakers and researchers can evaluate the consequences of electoral reform by simulating electoral results under the "old" electoral system.

Clearly, the estimates are not always precise. The FSS formula authors use three main assumptions for their formula to work, including that "normalized party vote shares average to national vote shares over all districts" (Flis et al., 2020, p. 207). However, under some electoral systems that have idiosyncratic electoral rules, their assumptions may be violated. Firstly, the presence of independent candidates who are strong in their respective regions creates a problem. For instance, such a situation occurred in the Turkish national elections in 2007 and 2012. Independent candidates competed only within specific districts, and they could not be treated as "parties." Therefore, an estimation using only the national estimates introduces a bias.

Secondly, there may be special rights assigned to minority parties. An example of such a situation is Poland, where official minorities do not need to pass nationwide thresholds in order to compete for seats in the districts where they are concentrated. Thanks to this rule, the German Minority has had representatives in the Sejm—in the recent 2019 election, one representative, despite having received only 0.17% of the total vote.

Thirdly, the formula is not precise in countries where there is a significant variation in district sizes. For instance, in Peru, the number of deputies elected in each district varies greatly. In such cases, a potential solution is to group smaller and larger districts together and then to apply the FSS formula to those district-groups separately.

Lastly, and most importantly, there may be an unequal distribution of votes due to ethnic or other regional divisions. Ethnic or regional representation may create serious problems for justifying proportional representation electoral systems (Latner & McGann, 2005; McLean, 1991; Norton, 1997). The seat estimates in countries where vote distributions are not homogenous among their regions and districts may be imprecise under the FSS formula. Some instances of such unequal distribution include Spain, Turkey, and Belgium, where ethnic-regional political parties are strong only in certain areas of these countries.

In this paper, I introduce an ad hoc correction to the FSS formula to obtain more precise estimates, even in countries that violate the regional homogeneity assumption. Using the 2018 parliamentary election in Turkey as a case study, I show that dividing the national distribution into regions that can reasonably be claimed to satisfy the assumptions of the formula within such regions, and then applying the formula to the separate regions, may remedy the problem and bring substantially

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more precise estimates than the original uncorrected formula. In this paper, I use a division of Turkish districts into regions that have historically or politically followed a specific pattern that would be followed by the application of the formula into those regions separately. In addition to the deliberate analysis of the 2018 parliamentary election in Turkey, I also apply the corrected FSS formula to Turkish elections held in 2007, 2011, June 2015, and November 2015 to check that the regional correction yields significantly better estimates than applying the uncorrected formula in these cases. I term this application "the FSS formula corrected." Additionally, following the regional correction, I also calculate the size of the improvement in the formula's estimating power. The results of using the FSS formula corrected are significant.

Turkey is an ethnically heterogeneous country where some political parties get overwhelming support in certain areas while their support is nonexistent in other areas. Therefore, I divide the Turkish electoral districts into three smaller regions. With the high number of total electoral districts, the average size of the three separate regions used in my calculations is about that of a medium-sized European country.

I show that while the Loosemore-Hanby (LH) goodness of fit is 4.09% when the FSS formula is applied to the 2018 parliamentary election in Turkey without any correction, the LH goodness of fit is 0.9% when the formula is separately applied to the three different regions that satisfy the assumptions of Flis, Słomczyński, and Stolicki (2019, 2020).[2] My analyses of the elections from 2007 to 2018 demonstrate that the formula with correction yields better LH goodness of fit by 2.10 percentage points to 3.41 percentage points (95% confidence interval [CI]).

The correction I analyze in this paper has already been applied by Evci and Kaminski (2020a, 2020b), who show that the electoral reform that the Turkish government passed in 2018 was a mistake. The Justice and Development Party (AKP), the party that was decisive in implementing the electoral reform, lost approximately 28 seats and the majority in the Parliament due to the electoral reform they introduced..

Why and where does the formula not work properly?

Introduction to the Turkish Electoral System

The current political system in Turkey is presidential. The present Parliament is unicameral. Before converting to the present system, the role of the president was symbolic; the Turkish Parliament determined the executive government, as the prime minister and the Council of Ministers had to receive a vote of confidence

[2] In my case, the LH index measures the deviation of the predicted distribution from the actual distribution of seats. I define and discuss this index in section 2 of this paper.

from Parliament. Essentially, the conversion to the presidential system redirected the authority to form the executive branch of the government from the Parliament to the president. Although the conversion to the presidential system weakened the Parliament, the Turkish Grand National Assembly still holds the power to legislate, override presidential decrees, and call for presidential elections. Furthermore, in cases where there is a conflict between a law and a presidential decree, the law enacted by Parliament takes precedence.

After the 1980 coup d'état, the Turkish military administration introduced an electoral system based on the Jefferson-D'Hondt method, with a unicameral Parliament. While 400 deputies were elected in the first parliamentary election in 1983, the number of deputies is currently 600. The most striking feature of the Turkish electoral system is the 10% national threshold. In 1983, the military administration introduced the electoral threshold to reduce the effective number of political parties to just two or three (Bakke & Sitter, 2005; Özbudun, 1996; Sayarı, 1992; see also Cox, 1997; Taagepera & Shugart, 1989). As the Jefferson-D'Hondt method already favors the largest parties, the world's highest threshold for single political has repeatedly resulted in consistent parliamentary disproportionality.

Turkey's regional heterogeneity among its districts stems from the regional concentration of Turkey's Kurdish population. The Kurdish population in Turkey is mostly concentrated in the southeast and in major metropolitan areas, whereas there are only a few Kurds living in the Black Sea region in northern Turkey.[3] As one might expect, the Kurdish population tends to vote for parties that represent Kurdish minority interests (Grigoriadis, 2016).[4] The single relevant political party that currently represents the nation's Kurdish population, the People's Democratic Party (HDP), is very strong in the southeast of the country, whereas support for the HDP is almost nonexistent in certain other areas, such as the north. Because of the seat-magnifying impact of the Jefferson-D'Hondt method, the HDP often gets a larger share of seats than its vote share in regions in which it is strong, and a smaller share of seats than its vote share in regions where it is weak. For instance, the parliamentary election results from November 1, 2015, show the impact of seat-magnification. Even if the Nationalistic Movement Party (MHP) had a larger share of the national vote—11.90% of the national vote, and 40 parliamentary seats—the HDP won more seats in

3 Because the Turkish government does not collect ethnic data, it is difficult to obtain precise estimates of regional ethnic populations. However, the presence of Turkey's Kurdish population is strongly correlated with the People's Democratic Party (HDP) vote. Therefore, Figure 1 demonstrates the proportion of Turkey's Kurdish population by showing the HDP vote.

4 Parties that represent Kurdish interests have been controversial in Turkey. Following the French model of citizenship (Yegen, 2004), Turkish administrations have refused the idea of minority political parties. Throughout the 1990s and 2000s, multiple Kurdish parties were closed or banned by the Turkish Constitutional Court. The most recent political party representing the Kurdish population, the HDP, was founded under the umbrella of leftist and socialist organizations representing a broader coalition of political forces.

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Parliament with a smaller share of the national vote—10.73% of the national vote, and 59 parliamentary seats—because the MHP was not the strongest party in any of the districts, whereas the HDP had the majority in the southeastern districts. Combined with the seat-magnification, such regional heterogeneity makes it extremely difficult to predict electoral results by looking only at the national distribution of votes.

Table 1
The Results of Major Parties and Alliances in the November 1, 2015, Parliamentary Election (Percentages)

Competitors	Votes	Seats
AKP	49.50	57.64 (317)
MHP	11.90	7.27 (40)
CHP	25.32	24.36 (134)
HDP	10.76	10.73 (59)
Total	97.48	100.0 (550)

Note: From Yüksek Seçim Kurulu (2020). Minor parties excluded. Some numbers do not add up to the total due to rounding and because minor parties are omitted. The numbers of parliamentary seats are shown in parentheses.

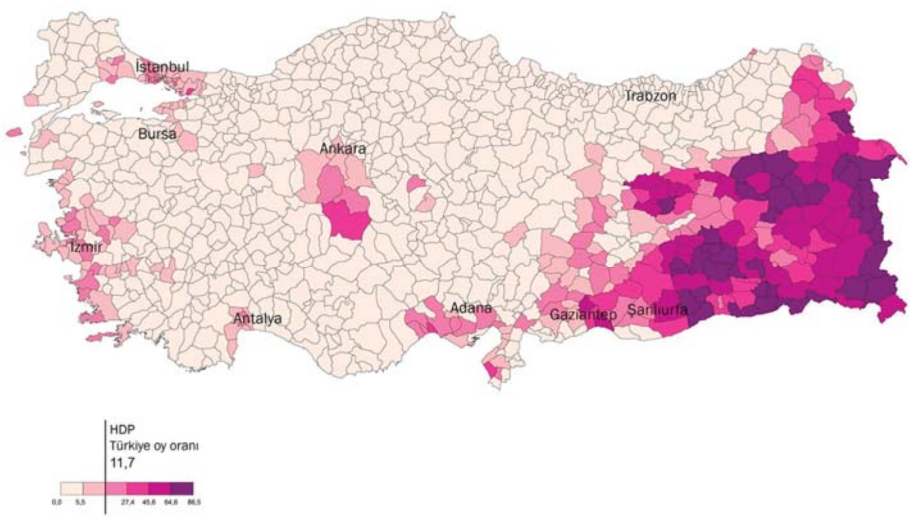

***Figure 1*. HDP's National Vote Distribution in the June 2018 Election**

Note. The darker purple denotes a higher vote share for the HDP. The map depicts populations of sub-districts (Konda, 2018).

SIMULATIONS: 2018 TURKISH PARLIAMENTARY ELECTIONS

The 2018 Turkish parliamentary election was unique in that it was the first election after the constitutional referendum that converted the Turkish political system from a parliamentary system to a presidential system. The election was also the first after a particular electoral reform, which brought about an *apparentement* system, allowing the parties to participate in elections as individual parties as well as members of coalitions. The governing party, the AKP, and the main opposition party, the Republican People's Party (CHP), were parts of separate coalitions, while the HDP remained a party with no allegiance to an alliance.

In this section, I show how the FSS formula without correction does not work in Turkey because of the HDP's strong regional presence. I then modify the application of the formula, which allows us to achieve much more precise electoral estimates. I first apply the formula to the election results by using only the national vote share without any regional corrections to show the discrepancy between the real results and the estimated results. Then, I apply regional corrections to demonstrate how regional correction can significantly improve the FSS formula's estimation power.

In this work, I use the LH goodness of fit between the actual election results and the simulated distributions of seats (Loosemore & Hanby, 1971). The LH goodness of fit measures the distance between two distributions—in our case, the percentages of parliamentary seats—and then adds up the absolute values of all errors and divides the total by two.

The vectors $\boldsymbol{p} = (p_i)_{i=1,\dots,n}$ and $\boldsymbol{q} = (q_i)_{i=1,\dots,n}$ denote two distributions of seats (with non-negative percentages that add up to 100 in both cases), and they are defined over the same set of n parties. Then the LH distance between the two distributions is expressed as follows:

$$LH\ (\boldsymbol{p}, \boldsymbol{q}) = \frac{1}{2}\sum_{1}^{n} |p_i - q_i|$$

The Logic Behind the Divided Regions

The calculations of the district divisions in this study could appear as if they are only linked to the vote distributions within districts. However, the model that I propose takes into account historical and ethnic divisions. Figure 1 shows that there is strong regionality in the HDP vote and the Kurdish population in Turkey. Although the official position of the Turkish state is not to recognize any ethnic identities, the

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country's Kurdish population has long dominantly inhabited the nation's southeastern region (Yeğen, 2009). Therefore, the regional divisions that I apply here essentially take the historical presence of the Kurdish vote into account when analyzing the elections instead of merely analyzing the district-level vote.

The following subsections present three separate scenarios. Under the first scenario, I apply the FSS formula to Turkish elections using only the national vote distribution. Under the second scenario, I divide the districts into two subsets based on the presence of the strong Kurdish voter population. Therefore, while the first region depicts the districts where there is no strong support for the HDP, the HDP is quite strong in the second region, with vote levels higher than 27.5%. However, as the analyses demonstrate, the fit is still not as good as the third scenario, where I divide the districts into three subsets: "HDP-absent," "HDP-present," "HDP-strong." By separating the districts where HDP is the strongest party and where HDP is present but not strong, I aim capturing the seat-magnifying impact of the Jefferson-D'Hondt method.

The logic behind scenario three is to create three separate regions. I call the three regions "HDP-strong," "HDP-present," and "HDP-absent." In "HDP-absent," support for the HDP is almost nonexistent. In the "HDP-present" region, there is some support for the HDP, although the HDP is not the strongest party in any of the districts. More specifically, while the HDP is not a relevant party in 44 districts (see Taagepera & Shugart, 1989), it is a relevant party in 28 districts — although it is not among the strongest parties in these 28 districts. In "HDP-strong," the HDP is either the strongest party or one of only two relevant parties, which is the case in 15 districts in the third region.

Scenario 1: Formula Predictions Without Any Modifications

Table 2 shows the formula predictions of election results without any regional corrections. In other words, Table 2 shows the discrepancy between the estimated number of seats using the FSS formula and the actual election results. We see that the results are significantly different, particularly for the AKP and the HDP. The AKP is present as a relevant party in every electoral district. Therefore, the FSS formula overestimates the number of seats for the stronger parties — the AKP and the CHP — while underestimating the number of seats for a regional party — the HDP. The LH index is 4.09%, which is worse than 80 out of the 84 European election cases that Flis, Słomczyński, and Stolicki (2018) tested with their formula.

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Table 2
FSS Formula Predictions of Election Results Without Correction

Competitors	Normalized Votes	Estimated Seats	Election Results (Seats)
AKP	0.43	308.90	295
MHP	0.11	48.04	49
CHP	0.23	155.78	146
IP	0.10	43.85	43
HDP	0.12	43.43	67
Alliances:			
Cumhur (AKP + MHP)	0.55	356.94	344
Millet (CHP + IP + SP)	0.33	199.63	189
Total		100.0 (600)	600

Note. Only relevant parties are listed. Loosemore-Hanby (LH) goodness of fit is 4.09%.

Scenario 2: Formula Predictions with Districts Divided into Two

To overcome the bias of regional parties in the second variant, Turkey is divided into two subsets of districts, depending on the strength of the HDP (see Table 3). The first region includes districts in which the HDP received less than 27.5% of the vote (72 districts), while the other region includes districts in which the HDP received over 27.5% of the vote (15 districts). In all of the districts in the first region, the HDP is either the strongest party or a strong contender. The three largest percentages of votes received by the HDP in the remaining districts were 23.5%, 17%, and 15.6%.

Table 3
Distribution of Votes in Two Regions

Competitors	First Region (72 Districts and 524 Seats)	Second Region (15 Districts and 76 Seats)
AKP	0.44	0.35
MHP	0.12	0.05
CHP	0.25	0.04
IP	0.11	0.02
HDP	0.08	0.54
Alliances:		
Cumhur (AKP + MHP)	0.56	0.40
Millet (CHP + IP + SP)	0.37	0.06

In the simulation, the Millet opposition alliance does not clear the natural threshold in the second region, in which the HDP received at least 27.5% of the total number of votes. Therefore, there are only two real competitors in these districts—the Alliance Cumhur and the HDP. After distributing seats to the alliance, it becomes evident that in the second region, the MHP cannot clear the natural threshold within the alliance, and therefore, all seats are shared between the AKP and the HDP.

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Table 4 shows the estimated distribution of seats in the second scenario. Here, the estimates are better than the estimates in the first scenario because the HDP receives more seats and the AKP receives fewer seats. However, their fit is still not satisfactory since the LH index is 1.75%, which is better than the LH-score of 36 out of 84 cases in Flis et al. (2018). Although the difference in the number of AKP seats is relatively small, one critical problem is that the formula predicts a majority rule for the AKP in the Parliament.

Table 4
Formula Predictions of Election Results with Two Regions

Competitors	Normalized Votes	Estimated Seats	Election Results (Seats)
AKP	0.43	303.56	295
MHP	0.11	47.03	49
CHP	0.23	147.20	146
IP	0.10	43.74	43
HDP	0.12	58.47	67
Alliances:			
Cumhur (AKP + MHP)	0.55	350.59	344
Millet (CHP + IP + SP)	0.33	190.94	189
Total		100.0 (600)	600

Note: Only relevant parties are listed. Loosemore-Hanby (LH) goodness of fit: 1.75%.

Scenario 3: Formula Predictions with Districts Divided into Three

The third scenario divides Turkey into three subsets of districts (see Table 5). Here, we find that while the HDP is strong in 15 districts, it is also very weak in 44 districts, receiving less than 4.6% of votes. Therefore, in the third scenario, the first region includes districts where the HDP received less than 4.6% (44 districts), the second region where the HDP received between 4.6% and 27.5% (28 districts), and the third region where the HDP received more than 27.5% (15 districts). In the first region, the competition is between the two alliances, Cumhur and Millet. In the second region, all three actors compete. Finally, in the last region, Cumhur competes with the HDP. In the third region, because the MHP cannot clear the natural threshold within the alliance, all seats go to the AKP (see Table 5). All essential simulations using the FSS formula in this paper can be replicated using the data found in Table 5. All three regions reasonably satisfy the assumptions put forward by Flis et al. (2020), as they do not present a large variation in voter distribution among themselves.

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Table 5
Distribution of Votes in Three Regions

Competitors	First Region (HDP-absent)	Second Region (HDP-present)	Third Region (HDP-strong)
AKP	0.5023 (0.5244)	0.4000 (0.4052)	0.3417 (0.3889)
MHP	0.1490 (0.1556)	0.1005 (0.1018)	0.0473 (0.0000)
CHP	0.1932 (0.2017)	0.2766 (0.2802)	0.0366 (0.0000)
IP	0.1134 (0.1183)	0.1044 (0.1058)	0.0238 (0.0000)
HDP	0.0273 (0.0000)	0.1057 (0.1070)	0.5370 (0.6111)
Simulation Parameters:			
n (number of relevant parties)	4	5	2
c (number of districts)	44	28	15
s (number of seats)	206	318	76

Note. Normalized votes after zeroing the results of irrelevant parties are shown in parentheses.

The third correction to the FSS formula is much better at estimating the distribution of seats in real elections (see Table 6). The biggest error is 2.99 seats for the CHP, while the error in estimating the AKP seats is only 0.98 seats. Thus, this variant seems to overcome the problems related to the existence of regional parties.

Table 6
FSS Formula Prediction of Election Results with Three Regions

Competitors	Normalized Votes (all regions)	Estimated Seats	Election Results	Error (in %)
AKP	0.43	295.98	295.00	-0.33
MHP	0.11	46.31	49.00	5.80
CHP	0.23	143.01	146.00	2.09
IP	0.10	45.39	43.00	-5.26
HDP	0.12	69.31	67.00	-3.34
Alliances:				
Cumhur (AKP + MHP)	0.55	342.29	344.00	0.50
Millet (CHP + IP + SP)	0.33	188.40	188.00	0.32

Note. Only relevant parties are listed. LH goodness of fit is 0.9%.

In Flis et al. (2018), the largest value of the LH index is for Spain's 1979 election, where the LH is 6.2%. Out of the 84 elections that they analyze, the value of LH is larger than 4% in only four elections. The LH is as small as 0.4% (Netherlands 1956 election), and the average LH in all 84 post-1945 parliamentary elections in eight European countries is 1.9%. It is important to note that the analysis by Flis et al. (2018) includes data from nations with regional voter distributions, such as Spain, where the formula does not work as well as it does in other countries.

The first scenario analyzed in this paper presents an LH value of 4.09%; therefore, the estimates are poor compared to Flis et al. (2018). Analyzing the second scenario, we find that the fit is much better. With an LH index of 1.75%, the second scenario leads to a better score in 36 out of 84 cases in Flis et al. (2018). The best fit, however, is provided by the third scenario. It has an LH index of 0.9%, which is a better fit than in 73 out of the 84 election cases in Flis et al. (2018).

A comparison between the second and the third scenarios shows the importance of the division criteria. While the first region includes districts where the HDP is not relevant at all, the HDP does have some presence in the second region. Without a separation between the complete lack of presence of regional parties in elections and some presence by regional parties, we treat the complete HDP absence and some HDP presence as the same. However, by dividing the districts into three, we have regions that are more homogenous within themselves, which helps to satisfy the assumptions by Flis et al. (2020). This method is likely to work in other countries where the FSS formula without corrections might not be as effective, such as the case of Spain. In Spain, certain parties participate in elections only regionally, which complicates the calculations if no correction is applied.

Further Cases

I next applied the corrected FSS formula to the June 2015, November 2015, June 2011, and July 2007 Turkish elections. In this section, I also report the estimates for the June 2018 election, which I obtained by applying the regional correction by using only regional-level aggregate data. The estimates for the June 2018 election using only regional-level aggregate data shows that the FSS formula with the correction does not necessitate access to district-level data. The estimates obtained by these 2007 to 2015 elections address the additional concerns specified in the introduction, such as the presence of independent candidates. The 2007 and 2011 elections are ones in which Kurdish political representation was not on the ballot as a political party per se, but run as independent candidates, since the Kurdish representation did not believe that they would clear the 10% threshold as a political party. The allocation of seats to independent candidates depended solely on the district-level vote, and the FSS formula does not include an option for having independent candidates. The June 2015 and November 2015 elections were the first in which the Kurds ran as a political party. These two 2015 elections were the last elections before the electoral reform of 2018, which enabled political alliances and an apparentement system in Turkish elections.

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Figure 2. **Regional Map of Turkey (Maps of World, 2017)**

The regional separation using aggregate-level data for the 2018 election is based on the presence and strength of the HDP, similar to the application of the FSS with correction to the June 2018 elections using district-level data. However, the regional separation only uses the aggregate regional data from the seven regions of Turkey (see Figure 2). Then, I divide Turkey into three regions, just as I did with the original method: HDP-strong (the Eastern and Southeast Anatolia regions), HDP-present (the Marmara, Aegean, and Meditarrenan regions), and HDP-absent (the Central Anatolia and Black Sea regions). The two cut-off points are the same as the original method used in this paper: 4.6%, and 27.5%.

Table 7
Comparison of Precision of Estimates

Elections	LH with the Correction (in %)	LH without the Correction (in %)	Largest Mistake with the correction (seats)	Largest mistake without the correction (seats)
2007	1.89	4.35	10.42	23.34
2011	2.32	4.79	12.79	26.33
2015 June	0.78	4.29	4.29	23.59
2015 November	2.10	4.07	8.76	22.39
2018 (regional division)	1.16	4.09	6.66	23.57
2018 (district division)	0.90	4.09	2.99	23.57

Note. In the 2007, 2011, and both 2015 elections, there were 550 seats in Parliament. In the 2018 election, the total number of seats was 600.

Table 7 shows that the formula applied with the regional correction is significantly more precise than the formula applied with no correction ($p < 0.01$, 95% CI [-3.41, -2.10]). Furthermore, the calculations demonstrate that the FSS formula without correction has problems estimating extreme values. While the largest mistakes in each election range from 22.39 to 26.33 when the formula is applied without a correction, the largest mistakes range from 12.79 to 2.99 when the formula is applied with the regional correction. In each election, the largest error obtained when the formula is applied without any correction is at least twice the size of the calculations with the regional correction.

The formula without any correction performs particularly poorly when there are independent candidates. Because independent candidates in Turkey act similarly to a political party—as they take advantage of the opportunity to enter elections as independent candidates to bypass the election ten percent electoral threshold—they are treated as a single party in the estimates. The FSS formula predicts 2.65 and 8.66 seats for independent candidates in the 2007 and 2011 elections, respectfully, whereas there were actually 26 and 35 independent candidates elected. On the other hand, the formula with the correction provides significantly better estimates for the independent candidates, as it predicts 26.88 seats in the 2007 election and 44.89 seats in the 2011 election. The estimates for the 2007 election are especially precise, as the error is only 0.16%. Thus, the additional cases demonstrate that the *ad hoc* correction to the formula is robust under various conditions.

Future Steps and Limitations

The correction can be applied to other countries that use the Jefferson-D'Hondt method and that have large ethnic cleavages, such as Spain or Belgium. A brief analysis of Spain's 2015 election shows that the regional correction improves the LH goodness of fit from 8% to 3.68%. A potential issue is the existence of districts that vary significantly in size, for example, those in Peru. One solution here would be to group smaller and larger districts together and then apply the formula to those regions separately.

One problem that arises with the method I propose in this paper is that researchers may still need access to district-level data. Yet, a significant advantage of the formula is that it allows researchers to use national-level data, which is available in most, if not all, cases. Additionally, using aggregate-level regional data, which is often easily accessible, is also a feasible alternative (see Haberturk, 2018; Ministerio del Interior, 2019). With regions that present ethnic patterns over decades, we would not need the district-level data as long as the countries report regional data. Table 7 shows that applying the correction based only on aggregate regional-level data for the 2018 Turkish general election improves the LH goodness of fit from 4.09% to 1.16%. While the correction based on district-level data is more precise for the 2018 Turkish election (LH fit is 0.9%, versus 1.16%), using aggregate-level regional data is more natural and provides researchers with a feasible alternative. The regional correction applied in Spain using three regions improves the LH index from 8% to 3.68%.[5] Thus, correction based on aggregate-level regional data is still significantly better than the FSS formula without correction when Flis et al.'s (2020) A1 assumption is violated. In general, the method proposed here can be applied to all countries where there are ethnic, religious, political, or other types of divisions.

Conclusion

In this paper, I propose an ad hoc correction to the FSS formula. The FSS formula predicts the number of seats obtained by political parties under a Jefferson-D'Hondt electoral system using only the national vote distribution. However, the FSS formula is less precise in countries where there are ethnic, political, or religious divisions due to the existence of regional political parties. Thus, this paper suggests using separate regions that can reasonably be assumed to satisfy the assumptions defined by Flis et al. (2020) and then applying the formula to these regions separately. By applying the formula to the Turkish general elections from 2007 to 2018, I show that the formula with correction yields a better LH index, from 3.41 percentage points to 2.10 percentage points (95% CI). Particularly, the LH fit in the 2018 election, 0.9%, is a better fit than in 73 out of 84 election cases examined by Flis et al. (2018). I also demonstrate that using aggregate regional-level data yields better estimates than the FSS formula without correction.

In terms of determining geographic divisions, I propose dividing districts into regions based on historical ethnic, political, or religious divisions that have led to the existence of regional parties. To further verify this work, future studies could apply the method proposed here to other cases, such as those in Spain or Belgium, or to earlier Turkish elections.

[5] The three regions are defined as Catalonia, the Basque Country, and the rest of the country.

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